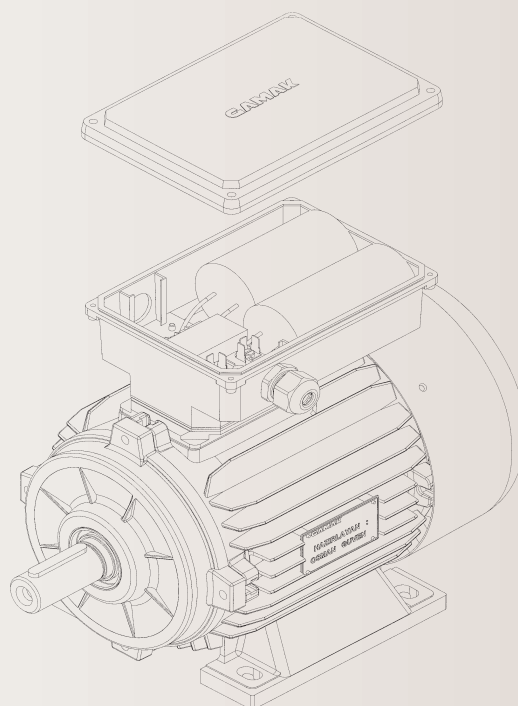


SINGLE PHASE MOTORS

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| - Permanent Split Capacitor Motors | |
| - Capacitor Start / Capacitor Run Motors | |
| • Shaded Pole Motors | 68-69 |



SINGLE PHASE, TOTALLY ENCLOSED (IP 55) GENERAL PURPOSE CAGE INDUCTION MOTORS

In many respects, single phase motors have the same properties as three-phase motors and mechanically they meet the same standards. The rotating field which develops the torque of the motor is formed by main and auxiliary windings. Dependent on the application, it is possible to use either permanent split capacitor motor or capacitor start/capacitor run motor. Each type has its benefits and limitations as described below :

● Permanent split capacitor motors

This type of single-phase motors have one capacitor mounted in the terminal box, permanently connected in series with the auxiliary winding. Efficiency and power factors are improved. Starting torque is between 50% - 80% of full load torque which makes this design particularly suitable for applications that require a light starting torque, such as circular saws, drilling machines, polishing machines, lawn movers, fans and blowers.



● Capacitor start / Capacitor run motors

This type of single-phase motors have two capacitors, short time rated high value starting capacitor and continuously rated low value permanent capacitor and an electronic start relay altogether mounted in the terminal box. The starting torque is between 200% - 250% of full load torque which makes this design particularly suitable for applications that require a high starting torque, such as compressors, hydraulic pumps and centrifugal pump drives with high starting requirements.



The wires coming out from the main and auxiliary windings and the cables of run capacitor and starting capacitor are all connected to the terminals of the electronic start relay. When the mains voltage is switched on to terminals L1 and L2, the main winding, the series connection of the auxiliary winding, the run capacitor and the starting capacitor are energized. The motor thus yields a high starting torque and begins to accelerate. A control circuit in the relay continuously measures the voltage across the auxiliary winding. When the motor has reached about 75-80% of its nominal speed, the electronic relay disconnects the starting capacitor from the starting circuit. The motor then continues to run on the two windings and the permanent capacitor like a normal permanent split capacitor motor.

An independent safety timer is incorporated in the electronic start relay for protecting the starting capacitor, should the rotor be locked or in the event of a very long start. This time function activates the electronic start relay if the motor during a start has not reached its nominal speed within about 2 seconds.

⚠ Maximum three starts are permitted per minute in order to ensure the protection of electrolytic type starting capacitor against damage.

⚠ Starting capacitors are fitted with resistance to ensure that they are discharged. Please consult us for the resistance and capacity values if the capacitors are needed to be replaced with the new ones.

Electronic start relay is designed to function at supply voltage of 220-240 V, 50 / 60 Hz. It eliminates the harmonics associated with the network and is protected against high currents.

The life of all-electronic start relay is endless when compared to centrifugal switches and different types of electromechanical relays.

The centrifugal and automatic switches have the disadvantage that they switch the starting capacitor into the circuit again, if the motor is overloaded. This has the result that the starting capacitor will be destroyed after rather a few overloads or after an excessively long starting period. Furthermore, the auxiliary windings may be damaged. When the electronic start relay has once been actuated, it can only be made to operate again when the motor is de-energized, This consequently prevents the starting capacitor from being switched in again should the motor be overloaded.

⚠ Standard single-phase motors should not run at no-load for a long period as the losses will be higher than that of a full load due to generated overvoltage which in turn will cause a fairly high temperature rise and also a reduction in the lifetime of capacitors.

● Frames, end-shields and flanges

Frame size 63...112, the frames, end-shields and the flanges are made of aluminium alloy which is pressure die-casting and resistible to corrosion. B14/FT165 flanges on frame size 112 motors are cast iron.

● Enclosure degrees of protection

GAMAK motors are manufactured as totally enclosed in conformity with the protection degree IP 55 which permits them to work in the ambient of dirty and humidity conditions. Upon request, any production can be made according to protection class IP 56, as well.

● Terminal box

All the terminal boxes comply with degree of protection IP 65, and are placed to the front and on top of motor frames allowing an easy cable entry from both sides. Electronic start relay, start and the permanent capacitors are located in the motor terminal box and a connecting diagram is provided in the cover of terminal box.

● Shaft Extension

The motors of standard design are built with one cylindrical shaft extension with shaft-key fitted in accordance with IEC 60 072-1. The free shaft-ends have threaded center-bore to DIN 332-2 form D. Motors with double shaft extension may be delivered on special orders.

The run-out of the shaft, concentricity of mounting spigot and the perpendicularity of the face flange are within the permissible limits (normal class) according to IEC 60 072-1. Motors with increased accuracy (Precision class) may be supplied on request.

● Vibration

Shaft/rotor assemblies of all standard range motors are dynamically balanced with Half Shaft Key to the limits of grade N (normal) mechanical vibration class specified in DIN EN 60 034-14. Shaft fitments such as couplings, pulleys, gears and fans must also be balanced likewise to prevent undue vibration and adverse effects on bearing life.

● Painting

The motors are painted in grey according to RAL 7031 (DIN 1843) with a protective paint. Special external coatings for protection against excessive corrosive atmospheres, chemicals and microorganism are available on request.

● Storage

Motors must be kept in a dry and vibration free place if they have to be stored for a long period. The insulation resistance must be dried if necessary, before the motors are taken into operation.

● Bearings

The motors are fitted with high quality noise tested single-row deep-groove radial ball bearings (DIN 625) which are both side closed (ZZ) and greased by the manufacture for life.

● Standard design with single row deep groove ball bearings

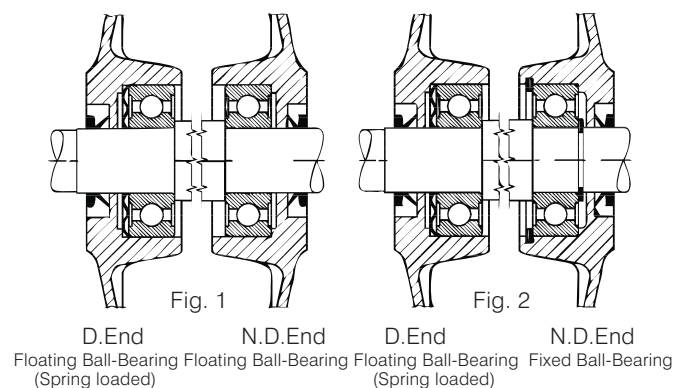
| Frame size | No. of pole | D.End | N.D. End | Fig. No. |
|------------|-------------|---------|----------|----------|
| 63 | 2 & 4 | 6201 ZZ | | 1 |
| 71 | 2 & 4 | 6202 ZZ | | |
| 80 | 2 & 4 | 6204 ZZ | | |
| 90 | 2 & 4 | 6205 ZZ | | |
| 100 | 2 & 4 | 6206 ZZ | | |
| 112 | 2 | 6206 ZZ | | |

On request, the motors can be manufactured in fixed bearing design (Fig. 2) in order to avoid the movement of the shaft in axial direction.

● Cable entry

| | | | | | | |
|---|-------|-------|----|----|-----|-----|
| Frame size | 63 | 71 | 80 | 90 | 100 | 112 |
| Dimensions of compression glands | Pg 11 | Pg 16 | | | | |
| Number of compression glands | 1 | | | | | |
| Maximum cable outer diameter mm | 11 | 16 | | | | |
| Maximum conductor cross section total mm ² | 1.5 | 2.5 | | | | |

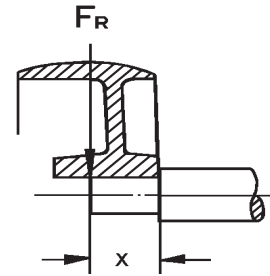
Arrangement of bearings



Permissible radial loads

Standard design with single row deep groove ball bearing (Axial Force $F_a = 0$)

| Frame size | 3000 min ⁻¹ | | 1500 min ⁻¹ | |
|------------|------------------------|-------------------|------------------------|-------------------|
| | F_{x_0} (N) | $F_{x_{max}}$ (N) | F_{x_0} (N) | $F_{x_{max}}$ (N) |
| 63 | 350 | 300 | 450 | 390 |
| 71 | 400 | 340 | 500 | 420 |
| 80 | 660 | 540 | 840 | 680 |
| 90 | 730 | 600 | 910 | 720 |
| 100 | 1030 | 820 | 1300 | 1050 |
| 112 | 1020 | 830 | - | - |



Permissible external axial loads

| Frame size | Horizontal Shaft | | | | Vertical Shaft | | | | | | | | | | | |
|------------|------------------|-----------|-----------|-----------|----------------|-----------|-----------|-------------|-------|-----------|------------|-----------|-----------|-------------|-------|-----------|
| | Drawing | | Push | | Shaft down | | | | | | Shaft up | | | | | |
| | | | | | Power down | | | Power above | | | Power down | | | Power above | | |
| | $F_r = 0$ | | $F_r = 0$ | | max. F_r | | $F_r = 0$ | max. F_r | | $F_r = 0$ | max. F_r | | $F_r = 0$ | max. F_r | | $F_r = 0$ |
| | X_0 | X_{max} | X_0 | X_{max} | X_0 | X_{max} | X_0 | X_{max} | X_0 | X_{max} | X_0 | X_{max} | X_0 | X_{max} | X_0 | X_{max} |

2 pole (3000 min⁻¹)

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 63 | 80 | 170 | 150 | 220 | 70 | 70 | 70 | 180 | 150 | 230 | 160 | 140 | 210 | 90 | 90 | 90 |
| 71 | 100 | 180 | 160 | 230 | 90 | 90 | 90 | 190 | 170 | 250 | 170 | 140 | 220 | 110 | 110 | 110 |
| 80 | 140 | 320 | 270 | 400 | 120 | 120 | 120 | 340 | 290 | 430 | 300 | 240 | 390 | 160 | 160 | 160 |
| 90 | 160 | 350 | 290 | 430 | 130 | 130 | 130 | 370 | 320 | 470 | 310 | 250 | 400 | 190 | 190 | 190 |
| 100 | 220 | 490 | 400 | 590 | 170 | 170 | 170 | 520 | 440 | 650 | 420 | 330 | 540 | 270 | 270 | 270 |
| 112 | 220 | 490 | 410 | 590 | 160 | 160 | 160 | 530 | 450 | 660 | 410 | 330 | 530 | 280 | 280 | 280 |

4 pole (1500 min⁻¹)

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 63 | 80 | 260 | 230 | 330 | 70 | 70 | 70 | 270 | 240 | 340 | 250 | 230 | 320 | 90 | 90 | 90 |
| 71 | 100 | 280 | 250 | 350 | 90 | 90 | 90 | 290 | 260 | 370 | 260 | 220 | 340 | 120 | 120 | 120 |
| 80 | 140 | 490 | 420 | 610 | 120 | 120 | 120 | 510 | 440 | 640 | 460 | 390 | 590 | 170 | 170 | 170 |
| 90 | 160 | 530 | 440 | 650 | 120 | 120 | 120 | 570 | 480 | 700 | 480 | 400 | 610 | 200 | 200 | 200 |
| 100 | 220 | 740 | 630 | 880 | 150 | 150 | 150 | 790 | 670 | 960 | 650 | 540 | 830 | 290 | 290 | 290 |

● Voltage and Frequency

Single phase motors are normally wound for the rated supply voltages of 230V and frequency 50/60 Hz. However, motors for a supply voltage of 110V may be supplied on request. Motors will operate satisfactorily within voltage band of $\pm 5\%$ of the rated voltage and $\pm 2\%$ of the rated frequency. In case of continuous operation at the extreme voltage limits specified above, the temperature rise limits permitted for various insulation classes may be exceeded by 10 K maximum.

● Rated output

The rated output P_N is the mechanical power in Watts available at the shaft, and it is specified on the motor name-plate. The active power P_1 , is the power in Watts transmitted from the supply to the motor and it is always bigger than the mechanical power due to losses.

$$P_1 (W) = U.I.\cos \varphi$$

Efficiency (η), is the ratio of the mechanical power to the active power. The efficiency values given in the catalog are calculated by the method of summation of losses according to IEC 60 034-2-1:2007.

The rated outputs tabulated in this catalogue expressed in kW, refer to the mechanical power where motor is running continuously (S1) at rated load, voltage, frequency, at ambient temperature not exceeding $+40^\circ\text{C}$ and an altitude of installation upto 1000 m above sea-level..

● Rated Torque

The torque transmitted to the motor shaft is :

$$\text{Rated torque (Nm)} = 9550 \frac{\text{Rated output (kW)}}{\text{Rated speed (min}^{-1}\text{)}}$$

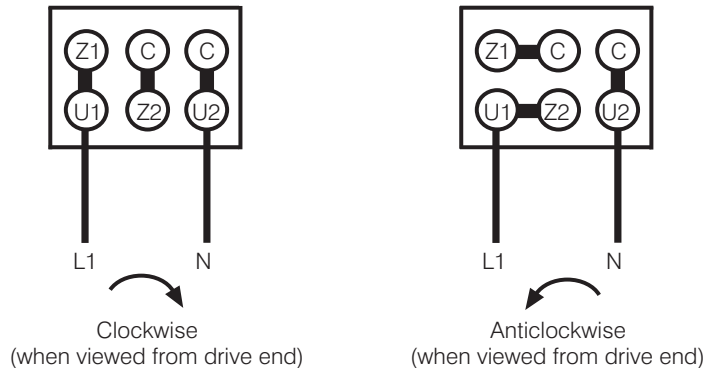
The load-torque of a motor during acceleration must always be bigger than the opposing torque of the driven machine.

⚠ Rotating magnetic field in single phase motors is formed with one phase of the A.C. supply which results with lower starting and/or nominal torque compared to three phase motors. In the event single phase motors are preferred instead of 3-phase motors, please consult **GAMAK** for detailed performance comparison..

● Reversing direction of rotation

Single phase motors can rotate to both directions like 3-phase motors.

The direction of rotation of a split phase permanent capacitor motor can be reversed as per connection diagram below :



To change direction of rotation at Capacitor start/Capacitor run motors, swap main winding leads (black-brown) at U1 and U2 terminals on the electronic relay.

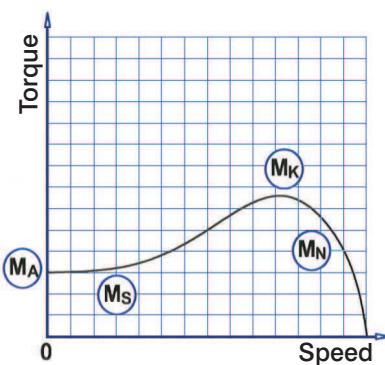
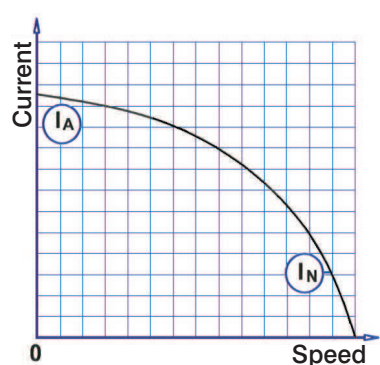
Direction of rotation must be checked by instant on/off before the motor is coupled to the driven machine.

● No-load operation

The voltage induced at the capacitors of single phase motors reaches to its maximum value when run at no load which results in reduction of capacitor life. Furthermore, single phase motors must not run at no load for long periods as losses at no load running is higher than that it is at full load running. Please consult **GAMAK** if long period of no-load running is required for the application as special winding may be necessary.

RATINGS AND PERFORMANCE

Permanent Split Capacitor Motors



Single Phase, 230 V, 50 Hz
Duty Type : S1 (continuous)
Degree of protection : IP 55
Insulation Class : F (155 °C)
Temp. Rise : B (80 K)

| Rated output kW | Type | Full - load data | | | | | Starting data | | Breakdown torque ratio M_K/M_N | Permanent capacitor μF | Moment of inertia J kgm ² | Weight approx. B3 kg |
|--------------------|------|-------------------|------------------|-----------------|-------------------------------|----------------------|----------------------------|---------------------------|-------------------------------------|--------------------------------|--|----------------------------|
| | | Speed | Current I_N | Torque M_N | Power factor Cos φ | Efficiency η | Current ratio I_A/I_N | Torque ratio M_A/M_N | | | | |
| | | min ⁻¹ | A | Nm | | % | | | | | | |

2 pole (3000 min⁻¹)

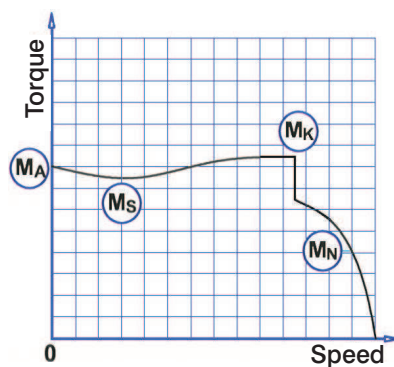
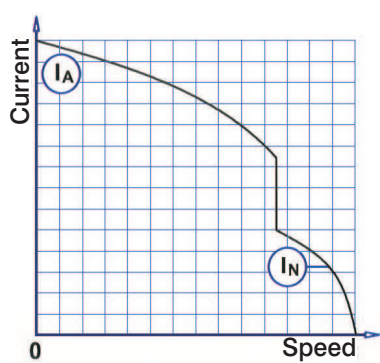
| | | | | | | | | | | | | |
|------|------------|------|------|-------|------|----|-----|------|-----|----|---------|------|
| 0,18 | MD 63 2a | 2860 | 1,3 | 0,60 | 0,94 | 64 | 4,2 | 0,85 | 2,4 | 8 | 0,00012 | 4,2 |
| 0,25 | MD 63 2b | 2870 | 1,6 | 0,83 | 0,98 | 69 | 4,0 | 0,75 | 2,2 | 10 | 0,00014 | 4,6 |
| 0,37 | MD 71 2a | 2885 | 2,5 | 1,22 | 0,96 | 67 | 4,0 | 0,65 | 2,2 | 15 | 0,00028 | 5,9 |
| 0,55 | MD 71 2b | 2865 | 3,5 | 1,83 | 0,98 | 70 | 3,9 | 0,72 | 2,3 | 20 | 0,00035 | 6,8 |
| 0,75 | MD 80 2a | 2770 | 5,0 | 2,59 | 0,96 | 68 | 3,3 | 0,88 | 1,9 | 30 | 0,00056 | 9,0 |
| 1,1 | MD 80 2b | 2770 | 7,0 | 3,79 | 0,95 | 72 | 3,8 | 0,93 | 2,0 | 35 | 0,00070 | 10,4 |
| 1,5 | MD 90 S 2 | 2820 | 9,8 | 5,08 | 0,91 | 73 | 4,2 | 0,60 | 2,0 | 40 | 0,00113 | 13,3 |
| 2,2 | MD 90 L 2 | 2800 | 13,5 | 7,50 | 0,95 | 75 | 3,4 | 0,50 | 1,7 | 50 | 0,00141 | 15,6 |
| 3 | MD 100 L 2 | 2850 | 17,7 | 10,05 | 0,97 | 76 | 4,7 | 0,49 | 2,2 | 60 | 0,00260 | 20,1 |

4 pole (1500 min⁻¹)

| | | | | | | | | | | | | |
|------|-------------|------|------|-------|------|----|-----|------|-----|----|---------|------|
| 0,12 | MD 63 4a | 1430 | 1,1 | 0,80 | 0,91 | 52 | 2,6 | 0,69 | 2,1 | 8 | 0,00019 | 4,1 |
| 0,18 | MD 63 4b | 1390 | 1,5 | 1,24 | 0,93 | 56 | 2,3 | 0,84 | 1,8 | 10 | 0,00023 | 4,6 |
| 0,25 | MD 71 4a | 1425 | 1,8 | 1,68 | 0,93 | 65 | 3,2 | 0,73 | 2,1 | 10 | 0,00048 | 6,1 |
| 0,37 | MD 71 4b | 1435 | 2,6 | 2,46 | 0,91 | 68 | 2,8 | 0,65 | 1,9 | 15 | 0,00056 | 6,6 |
| 0,55 | MD 80 4a | 1410 | 3,3 | 3,73 | 0,97 | 75 | 3,4 | 0,51 | 1,7 | 20 | 0,00092 | 8,7 |
| 0,75 | MD 80 4b | 1405 | 4,6 | 5,10 | 0,98 | 72 | 3,5 | 0,55 | 1,8 | 30 | 0,00123 | 10,3 |
| 1,1 | MD 90 S 4 | 1410 | 7,1 | 7,45 | 0,96 | 70 | 3,5 | 0,63 | 1,9 | 35 | 0,00209 | 13,3 |
| 1,5 | MD 90 L 4 | 1410 | 9,3 | 10,16 | 0,96 | 72 | 3,3 | 0,57 | 1,8 | 50 | 0,00265 | 15,8 |
| 2,2 | MD 100 L 4a | 1425 | 13,4 | 14,74 | 0,93 | 77 | 4,1 | 0,40 | 1,8 | 60 | 0,0044 | 21,0 |
| 3 | MD 100 L 4b | 1425 | 19,0 | 20,11 | 0,86 | 80 | 3,6 | 0,30 | 1,7 | 60 | 0,0051 | 23,2 |

RATINGS AND PERFORMANCE

Capacitor Start / Capacitor Run Motors



Single Phase, 230 V, 50 Hz
Duty Type : S1 (continuous)
Degree of protection : IP 55
Insulation Class : F (155 °C)
Temp. Rise : B (80 K)

| Rated output | Type | Full - load data | | | | | Starting data | | Breakdown torque ratio | Starting capacitor | Permanent capacitor | Moment of inertia | Weight approx. |
|--------------|------|-------------------|---------------------------|--------------------------|--------------|-----------|--------------------------------|--------------------------------|--------------------------------|--------------------|---------------------|-----------------------|----------------|
| | | Speed | Current I _N | Torque M _N | Power factor | Eff. η | Current ratio | Torque ratio | | | | | |
| kW | | min ⁻¹ | A | Nm | Cos φ | % | I _A /I _N | M _A /M _N | M _K /M _N | 330 V μF | 400 V μF | J kgm ² | B3 kg |

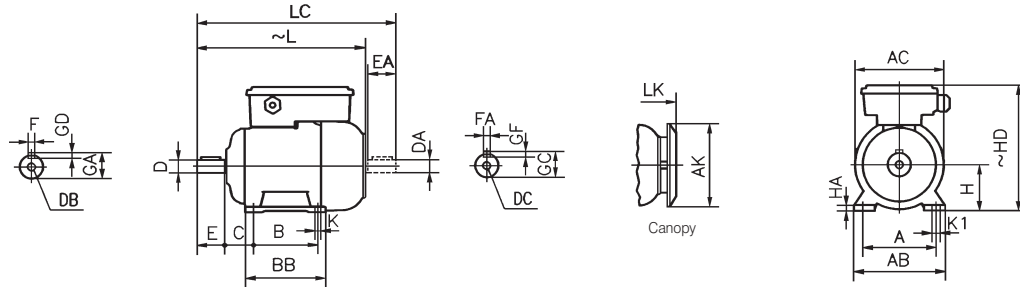
2 pole (3000 min^{-1})

| | | | | | | | | | | | | | |
|------|-------------|------|------|-------|------|----|-----|-----|-----|--------------|----|---------|------|
| 0,18 | MSD 63 2a | 2860 | 1,3 | 0,60 | 0,94 | 64 | 5,1 | 2,3 | 2,4 | 21-25 | 8 | 0,00012 | 4,5 |
| 0,25 | MSD 63 2b | 2870 | 1,6 | 0,83 | 0,98 | 70 | 4,9 | 2,1 | 2,2 | 30-36 | 10 | 0,00014 | 4,9 |
| 0,37 | MSD 71 2a | 2885 | 2,5 | 1,22 | 0,96 | 67 | 4,7 | 2,1 | 2,2 | 53-64 | 15 | 0,00028 | 6,2 |
| 0,55 | MSD 71 2b | 2865 | 3,5 | 1,83 | 0,98 | 70 | 4,7 | 2,2 | 2,3 | 88-106 | 20 | 0,00035 | 7,2 |
| 0,75 | MSD 80 2a | 2770 | 5,0 | 2,59 | 0,96 | 68 | 4,3 | 1,8 | 1,9 | 88-106 | 30 | 0,00056 | 9,4 |
| 1,1 | MSD 80 2b | 2770 | 7,0 | 3,79 | 0,95 | 72 | 4,6 | 1,9 | 2,0 | 130-156 | 35 | 0,00070 | 10,9 |
| 1,5 | MSD 90 S 2 | 2820 | 9,8 | 5,08 | 0,91 | 73 | 5,4 | 2,0 | 2,0 | 233-280/250V | 40 | 0,00113 | 13,8 |
| 2,2 | MSD 90 L 2 | 2800 | 13,5 | 7,50 | 0,95 | 75 | 4,6 | 1,7 | 1,7 | 233-280/250V | 50 | 0,00141 | 16,1 |
| 3 | MSD 100 L 2 | 2850 | 17,7 | 10,05 | 0,97 | 76 | 5,3 | 2,1 | 2,2 | 233-280/250V | 60 | 0,00260 | 20,6 |
| 4 | MSD 112 M 2 | 2885 | 22,0 | 13,24 | 0,93 | 85 | 5,1 | 2,1 | 2,2 | 233-280/250V | 60 | 0,00410 | 26,9 |

4 pole (1500 min^{-1})

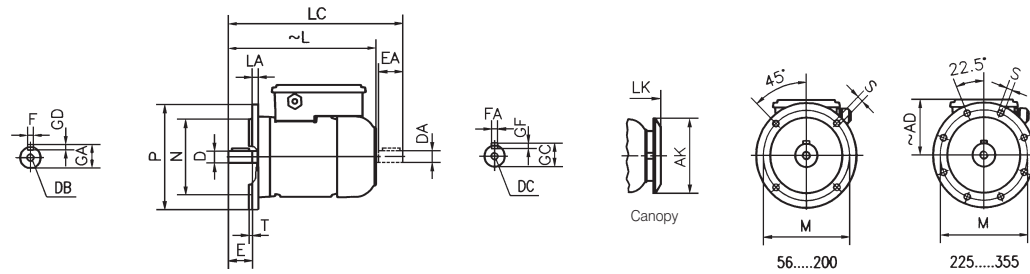
| | | | | | | | | | | | | | |
|------|--------------|------|------|-------|------|----|-----|-----|-----|--------------|----|---------|------|
| 0,12 | MSD 63 4a | 1430 | 1,1 | 0,80 | 0,91 | 52 | 4,0 | 1,9 | 2,1 | 21-25 | 8 | 0,00019 | 4,4 |
| 0,18 | MSD 63 4b | 1390 | 1,5 | 1,24 | 0,93 | 56 | 3,6 | 1,8 | 1,8 | 30-36 | 10 | 0,00023 | 4,9 |
| 0,25 | MSD 71 4a | 1425 | 1,8 | 1,68 | 0,93 | 65 | 4,5 | 2,3 | 2,1 | 36-43 | 10 | 0,00048 | 6,4 |
| 0,37 | MSD 71 4b | 1435 | 2,6 | 2,46 | 0,91 | 68 | 3,8 | 2,0 | 1,9 | 36-43 | 15 | 0,00056 | 6,9 |
| 0,55 | MSD 80 4a | 1410 | 3,3 | 3,73 | 0,97 | 75 | 4,5 | 2,2 | 1,7 | 88-106 | 20 | 0,00092 | 9,1 |
| 0,75 | MSD 80 4b | 1405 | 4,6 | 5,10 | 0,98 | 72 | 4,5 | 2,5 | 1,8 | 108-130 | 30 | 0,00123 | 10,8 |
| 1,1 | MSD 90 S 4 | 1410 | 7,1 | 7,45 | 0,96 | 70 | 4,8 | 2,4 | 1,9 | 145-174 | 35 | 0,00209 | 13,8 |
| 1,5 | MSD 90 L 4 | 1410 | 9,3 | 10,16 | 0,96 | 73 | 4,7 | 2,7 | 1,8 | 161-193 | 50 | 0,00265 | 16,3 |
| 2,2 | MSD 100 L 4a | 1425 | 13,4 | 14,74 | 0,93 | 77 | 4,6 | 2,3 | 1,8 | 233-280/250V | 60 | 0,00440 | 21,5 |
| 3 | MSD 100 L 4b | 1425 | 19,0 | 20,11 | 0,86 | 80 | 4,0 | 1,7 | 1,7 | 233-280/250V | 60 | 0,00510 | 23,7 |

DIMENSIONS



FOOT MOUNTED MOTORS - B3, B6, B7, B8, B15, V5, V6

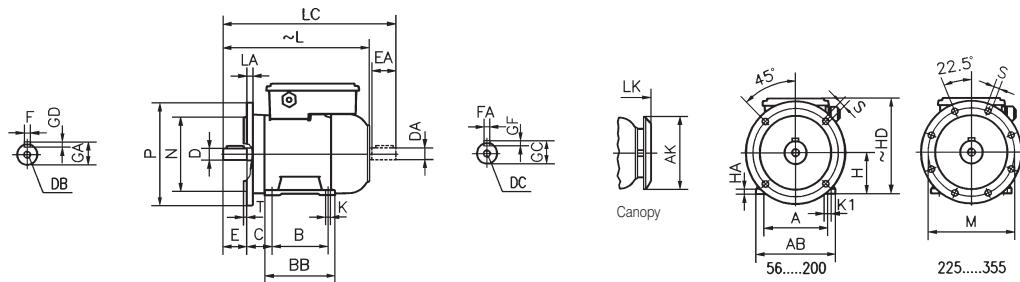
| Frame size | Number of pole | H | HD ¹⁾ | HD ²⁾ | HA | A | AB | ACØ | AKØ | KØ | K1 | B | BB | L | LC | LK | C | E EA | DB ³⁾ | DØ DAØ | GA GC | FXGD FAXGF |
|------------|----------------|------|------------------|------------------|-----|--------|-----|-----|-----|----|----|--------|-----|-----|-----|-----|------|------|------------------|--------|-------|------------|
| 63 | 2-4 | 63 | 201 | 189 | 10 | 100 | 125 | 121 | 116 | 7 | 11 | 80 | 103 | 215 | 242 | 245 | 40 | 23 | M4 | 11 | 12.5 | 4X4 |
| 71 | 2-4 | 71 | 208 | 196 | 10 | 112 | 140 | 138 | 116 | 7 | 11 | 90 | 108 | 247 | 282 | 277 | 45 | 30 | M5 | 14 | 16 | 5X5 |
| 80 | 2-4 | 80 | 224 | 212 | 10 | 125 | 160 | 156 | 150 | 10 | 15 | 100 | 125 | 278 | 323 | 308 | 50 | 40 | M6 | 19 | 21.5 | 6X6 |
| 90 | S L | 90 | 242 | 230 | 12 | 140 | 180 | 176 | 150 | 10 | 15 | 100 | 130 | 308 | 363 | 338 | 56 | 50 | M8 | 24 | 27 | 8X7 |
| | | | | | | | | | | | | 125 | 155 | 333 | 388 | 363 | 60 | 60 | M10 | 28 | 31 | 8X7 |
| 100 | L | 2-4 | 100 | 271 | 259 | 13 | 160 | 200 | 194 | 12 | 18 | 140 | 175 | 375 | 441 | 410 | 63 | 60 | M10 | 28 | 31 | 8X7 |
| 112 | M | 2 | 112 | 294 | - | 13 | 190 | 230 | 218 | 12 | 18 | 140 | 175 | 392 | 458 | 432 | 70 | 60 | M10 | 28 | 31 | 8X7 |
| Tolerances | | -0.5 | | | | ± 0.75 | | | | | | ± 0.75 | | | | | -0.5 | | j6 | | | h9X |



FLANGED MOTORS (FORM "A" - DIN EN 50 347) - B5, V1, V3

Note: The seating face of the flanges lies in the same plane as the shoulder on the shaft.

| Frame size | Number of pole | Flange No. | MØ | NØ | PØ | Clearance hole | | T | LA | AD ¹⁾ | AD ²⁾ | AKØ | L | LC | LK | E EA | DB ³⁾ | DØ DAØ | GA GC | FXGD FAXGF | | | |
|------------|----------------|------------|-----|-----|-----|----------------|------|-----|----|------------------|------------------|-----|-----|-----|-----|------|------------------|--------|-------|------------|--|-----|--|
| | | | | | | No. | SØ | | | | | | | | | | | | | | | | |
| 63 | 2-4 | FF115 | 115 | 95 | 140 | 4 | 10 | 3 | 10 | 138 | 126 | 116 | 215 | 242 | 245 | 23 | M4 | 11 | 12.5 | 4X4 | | | |
| 71 | 2-4 | FF130 | 130 | 110 | 160 | 4 | 10 | 3.5 | 10 | 137 | 125 | 116 | 247 | 282 | 277 | 30 | M5 | 14 | 16 | 5X5 | | | |
| 80 | 2-4 | FF165 | 165 | 130 | 200 | 4 | 12 | 3.5 | 12 | 144 | 132 | 150 | 278 | 323 | 308 | 40 | M6 | 19 | 21.5 | 6X6 | | | |
| 90 | S L | FF165 | 165 | 130 | 200 | 4 | 12 | 3.5 | 12 | 152 | 140 | 150 | 308 | 363 | 338 | 50 | M8 | 24 | 27 | 8X7 | | | |
| | | | | | | | | | | | | | 333 | 388 | 363 | | | | | | | | |
| 100 | L | FF215 | 215 | 180 | 250 | 4 | 14.5 | 4 | 15 | 171 | 159 | 188 | 375 | 441 | 410 | 60 | M10 | 28 | 31 | 8X7 | | | |
| 112 | M | FF215 | 215 | 180 | 250 | 4 | 14.5 | 4 | 15 | 182 | - | 188 | 392 | 458 | 432 | 60 | M10 | 28 | 31 | 8X7 | | | |
| Tolerances | | | j6 | | | | | | | | | | | | | | | -0.5 | | j6 | | h9X | |



FOOT AND FLANGED MOTORS (FORM "A" - DIN EN 50 347) - B35

Note: The seating face of the flange lies in the same plane as the shoulder on the shaft.

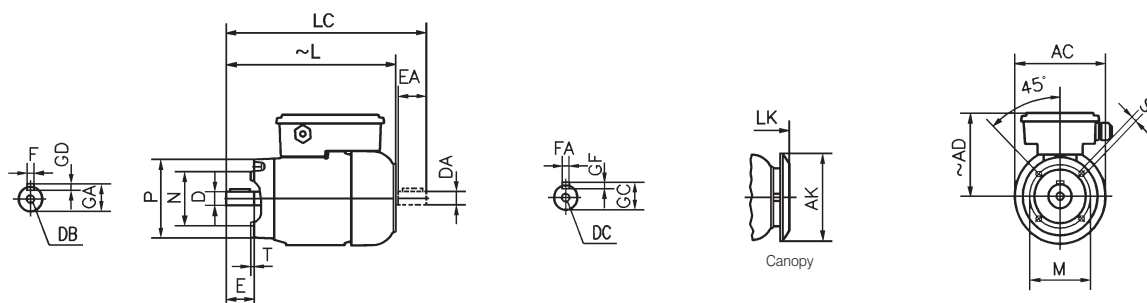
| SIZES METRIC (mm) | | | | | | | | | | | | | | SIZES INCH (in) | | | | | | | | | | | | | | Note: The seating face of the flange lies in the same plane as the shoulder on the shaft. | | | | | | | | | | | | | |
|-------------------|----------------|------|------------------|------------------|-----|--------|-----|-----|-----|----|--------|-----|--------|-----------------|-----|-----|-----|----|------|-----|-----|-----|-----|-----|------|------------------|--------|---|------------|-----|--|--|--|--|--|--|--|--|--|--|--|
| Frame size | Number of pole | H | HD ¹⁾ | HD ²⁾ | HA | A | AB | AKØ | KØ | K1 | B | BB | Flange | MØ | NØ | NØ | No | SØ | T | LA | L | LC | LK | C | E EA | DB ³⁾ | DØ DAØ | GA GC | FXGD FAXGF | | | | | | | | | | | | |
| 63 | 2-4 | 63 | 201 | 189 | 10 | 100 | 125 | 116 | 7 | 11 | 80 | 103 | FF115 | 115 | 95 | 140 | 4 | 10 | 3 | 10 | 215 | 242 | 245 | 40 | 23 | M4 | 11 | 12.5 | 4X4 | | | | | | | | | | | | |
| 71 | 2-4 | 71 | 208 | 196 | 10 | 112 | 140 | 116 | 7 | 11 | 90 | 108 | FF130 | 130 | 110 | 160 | 4 | 10 | 3.5 | 10 | 247 | 282 | 277 | 45 | 30 | M5 | 14 | 16 | 5X5 | | | | | | | | | | | | |
| 80 | 2-4 | 80 | 224 | 212 | 10 | 125 | 160 | 150 | 10 | 15 | 100 | 125 | FF165 | 165 | 130 | 200 | 4 | 12 | 3.5 | 12 | 278 | 323 | 308 | 50 | 40 | M6 | 19 | 21.5 | 6X6 | | | | | | | | | | | | |
| 90 | S L | 2-4 | 90 | 242 | 230 | 12 | 140 | 180 | 150 | 10 | 15 | 100 | 130 | FF165 | 165 | 130 | 200 | 4 | 12 | 3.5 | 12 | 308 | 363 | 338 | 56 | 50 | M8 | 24 | 27 | 8X7 | | | | | | | | | | | |
| 333 | | | | | | | | | | | | | | | | | | | | | | 388 | 363 | | | | | | | | | | | | | | | | | | |
| 100 | L | 2-4 | 100 | 271 | 259 | 13 | 160 | 200 | 188 | 12 | 18 | 140 | 175 | FF215 | 215 | 180 | 250 | 4 | 14.5 | 4 | 15 | 375 | 441 | 410 | 63 | 60 | M10 | 28 | 31 | 8X7 | | | | | | | | | | | |
| 112 | M | 2 | 112 | 294 | - | 13 | 190 | 230 | 188 | 12 | 18 | 140 | 175 | FF215 | 215 | 180 | 250 | 4 | 14.5 | 4 | 15 | 392 | 458 | 432 | 70 | 60 | M10 | 28 | 31 | 8X7 | | | | | | | | | | | |
| Tolerances | | -0.5 | | | | ± 0.75 | | | | | ± 0.75 | | | | j6 | | | | | | | | | | -0.5 | | j6 | | | h9X | | | | | | | | | | | |

¹⁾ Capacitor start / capacitor run motors

²⁾ Permanent split capacitor motors

³⁾ DIN 332-2 form D

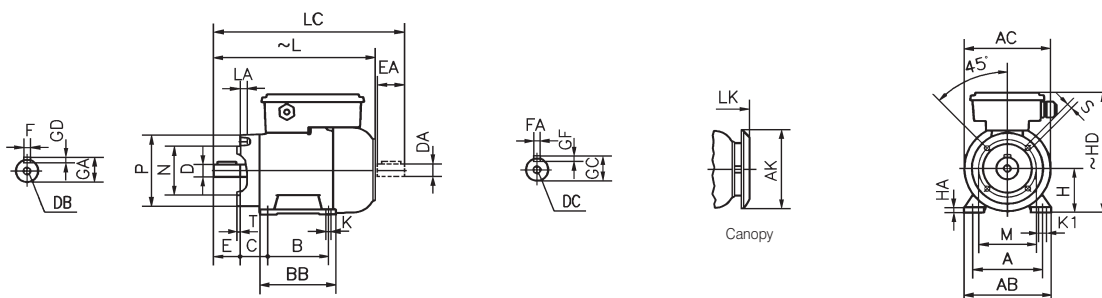
All dimensions in mm



FLANGED MOTORS (FORM "C" - DIN EN 50 347) - B14, V18, V19

Note: The seating face of the flange lies in the same plane as the shoulder on the shaft.

| Foot mounted motor dimensions : Mounting arrangements B3, B6, B7, B8, B15, V5, V6 | | | | | | | | | | | | | | | | | | | | |
|---|----------------|------------|--------|-----|-----|-----|-----|----|-----|-----|-----------------------|-----------------------|--------|-----|---------|---------|------------------------|-----------|----------|---------------|
| Frame size | Number of pole | Flange No. | MØ | NØ | PØ | S | T | LS | ACØ | AKØ | AD ¹⁾ ~ | AD ²⁾ ~ | L ~ | LC | LK ~ | E EA | DB ³⁾ DC | DØ DAØ | GA GC | FXGD FAXGF |
| 63 | 2-4 | FT 75 | 75 | 60 | 90 | M 5 | 2.5 | 10 | 121 | 116 | 138 | 126 | 215 | 242 | 245 | 23 | M 4 | 11 | 12.5 | 4x4 |
| | | FT100 | 100 | 80 | 120 | M 6 | 3 | 12 | | | | | | | | | | | | |
| 71 | 2-4 | FT 85 | 85 | 70 | 105 | M 6 | 2.5 | 12 | 138 | 116 | 137 | 125 | 247 | 282 | 277 | 30 | M 5 | 14 | 16 | 5x5 |
| | | FT115 | 115 | 95 | 140 | M 8 | 3 | 16 | | | | | | | | | | | | |
| 80 | 2-4 | FT100 | 100 | 80 | 120 | M 6 | 3 | 12 | 156 | 150 | 144 | 132 | 278 | 323 | 308 | 40 | M 6 | 19 | 21.5 | 6x6 |
| | | FT130 | 130 | 110 | 160 | M 8 | 3.5 | 16 | | | | | | | | | | | | |
| 90 | S | FT115 | 115 | 95 | 140 | M 8 | 3 | 16 | 176 | 150 | 152 | 140 | 308 | 363 | 338 | 50 | M 8 | 24 | 27 | 8x7 |
| | | FT130 | 130 | 110 | 160 | | 3.5 | | | | | | 333 | 415 | 363 | | | | | |
| | L | FT115 | 115 | 95 | 140 | | 3 | | | | | | | | | | | | | |
| | | FT130 | 130 | 110 | 160 | | 3.5 | | | | | | | | | | | | | |
| 100 | L | FT130 | 130 | 110 | 160 | M 8 | 3.5 | 16 | 194 | 188 | 171 | 159 | 375 | 441 | 415 | 60 | M10 | 28 | 31 | 8x7 |
| | | FT165 | 165 | 130 | 200 | M10 | 3.5 | 20 | | | | | | | | | | | | |
| 112 | M | FT130 | 130 | 110 | 160 | M 8 | 3.5 | 16 | 218 | 188 | 182 | - | 392 | 458 | 432 | 60 | M10 | 28 | 31 | 8x7 |
| | | FT165 | 165 | 130 | 200 | M10 | 3.5 | 12 | | | | | | | | | | | | |
| Tolerances | | | ± 0.25 | j6 | | | | | | | | | | | | -0.5 | | j6 | | h9x |



FOOT AND FLANGED MOTORS (FORM "C" - DIN EN 50 347) - B34

Note: The seating face of the flange lies in the same plane as the shoulder on the shaft.

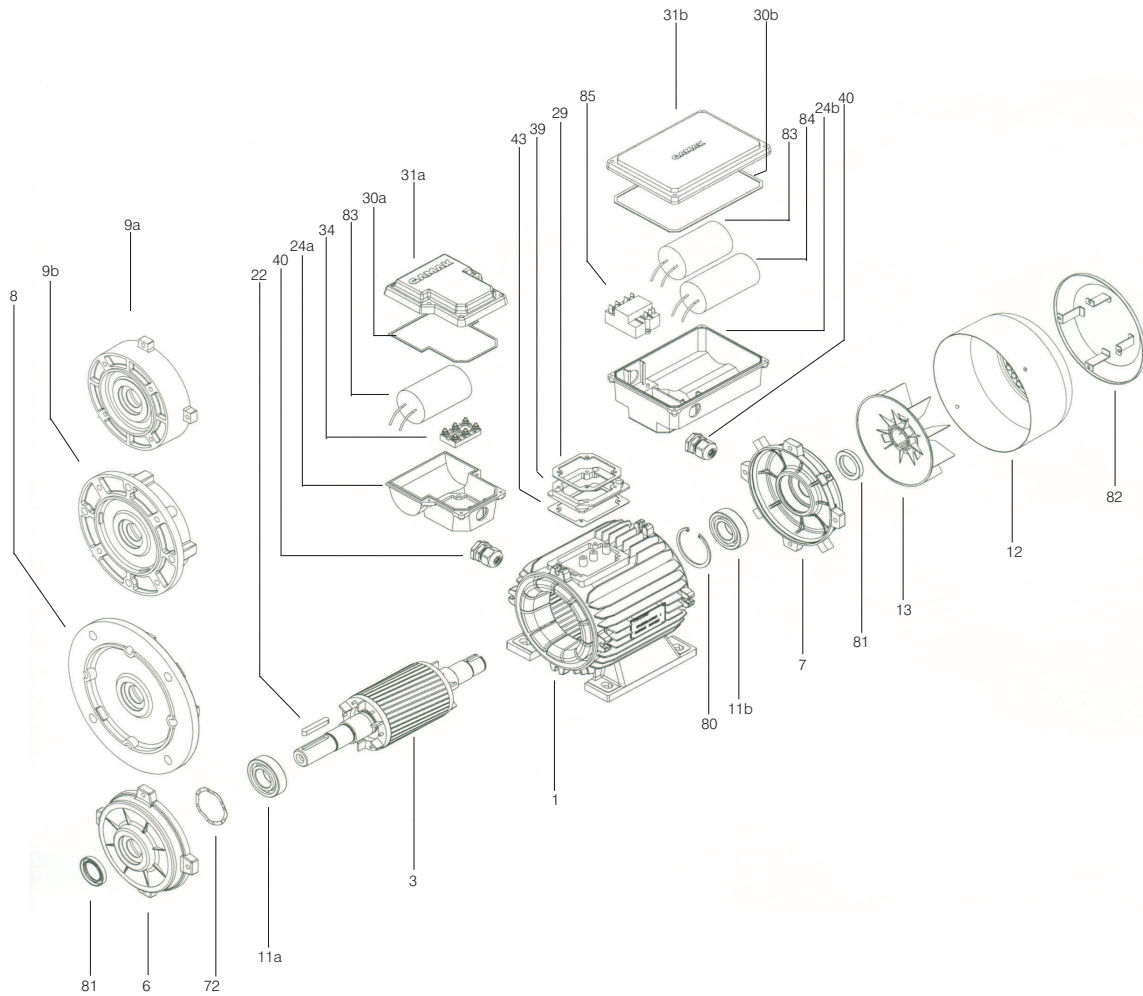
| Frame size | Number of pole | Foot mounted motor dimensions : Mounting arrangements B3, B6, B7, B8, B15, V5, V6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|----------------|---|--------------------------|--------------------------|-----|-----|--------|----------|----------|-----|----|-----|--------|----------------|----------------|------------|------------|------------|------------|------------|--------|-----|---------|-----|---------|---------------------------|-----------|----------|---------------|-----|-----|-----|
| | | H | ¹⁾ HD ~ | ²⁾ HD ~ | HA | A | AB | ACØ | AKØ | KØ | K1 | B | BB | Flange No. | LS | MØ | NØ | PØ | S | T | L ~ | LC | LK ~ | C | E EA | ³⁾ DB DC | DØ DAØ | GA GC | FXGD FAXGF | | | |
| 63 | 2-4 | 63 | 201 | 189 | 10 | 100 | 125 | 121 | 116 | 7 | 11 | 80 | 103 | FT 75 FT100 | 10 12 | 75 100 | 60 80 | 90 120 | M 5 M 6 | 2.5 3 | 215 | 245 | 245 | 40 | 23 | M 4 | 11 | 12.5 | 4x4 | | | |
| 71 | 2-4 | 71 | 208 | 196 | 10 | 112 | 140 | 138 - | 116 | 7 | 11 | 90 | 108 | FT 85 FT115 | 12 16 | 85 115 | 70 95 | 105 140 | M 6 M 8 | 2.5 3 | 247 | 277 | 277 | 45 | 30 | M 5 | 14 | 16 | 5x5 | | | |
| 80 | 2-4 | 80 | 224 | 212 | 10 | 125 | 160 | 156 - | 150 | 10 | 15 | 100 | 125 | FT100 FT130 | 12 16 | 100 130 | 80 110 | 120 160 | M 6 M 8 | 3 3.5 | 278 | 308 | 308 | 50 | 40 | M 6 | 19 | 21.5 | 6x6 | | | |
| 90 | S — L | 2-4 | 90 | 242 | 230 | 12 | 140 | 180 | 176 | 150 | 10 | 15 | 100 | 130 | FT115 | 16 | 115 | 95 | 140 | M 8 | 3 | 308 | 338 | 338 | 56 | 50 | M 8 | 24 | 27 | 8x7 | | |
| | | | | | | | | | | | | | | | FT130 | | 130 | 110 | 160 | | 3.5 | | | | | | | | | | | |
| | 2-4 | FT115 | | | | | | | | | | | | | 115 | | 95 | 140 | 3 | | 333 | | | | | | | | | | 363 | 363 |
| | | FT130 | | | | | | | | | | | | | 130 | | 110 | 160 | 3.5 | | | | | | | | | | | | | |
| 100 | L | 2-4 | 100 | 271 | 259 | 13 | 160 | 200 | 194 - | 188 | 12 | 18 | 140 | 175 | FT130 FT165 | 16 20 | 130 165 | 110 130 | 160 200 | M 8 M10 | 3.5 | 375 | 415 | 415 | 63 | 60 | M10 | 28 | 31 | 8x7 | | |
| 112 | M | 2-4 | 112 | 294 | - | 13 | 190 | 230 | 218 | 188 | 12 | 18 | 140 | 175 | FT130 FT165 | 16 12 | 130 165 | 110 130 | 160 200 | M 8 M10 | 3.5 | 392 | 432 | 432 | 70 | 60 | M10 | 28 | 31 | 8x7 | | |
| Tolerances | | -0.5 | | ± 0.75 | | | ± 0.75 | | | | | | ± 0.75 | | ± 0.25 | | | j6 | | | | | -0.5 | | j6 | | h9x | | | | | |

¹⁾ Start capacitor motors

²⁾ Permanent split capacitor motors ³⁾ DIN 332-2 form D

All dimensions in mm

SPARES



- 1 Stator complete with winding, varnished and fitted in the frame
- 3 Rotor complete with shaft, finish machined and balanced (Excluding keys)
- 6 End Shield Drive-end B3 mounting
- 7 End Shield Non drive end
- 8 D-Flange (Form A-"FF") - Please state flange number
- 9a C-Face Flange (Form C-"FT") - Please state flange number
- 9b C-Face Flange (Form C-"FT", big type) - Please state flange number
- 11a Drive end bearing
- 11b Non Drive end bearing
- 12 Fan cover
- 13 Fan
- 22 Shaft key
- 30a Terminal box to lid gasket - Permanent split capacitor design
- 31a Terminal box lid - Permanent split capacitor design
- 24a Terminal box - Permanent split capacitor design
- 34 Terminal board complete with terminal links, nuts and washers
- 30b Terminal box to lid gasket - Capacitor start / capacitor run design
- 31b Terminal box lid - Capacitor start / capacitor run design
- 24b Terminal box - Capacitor start / capacitor run design
- 29 Adaptor plate to terminal box gasket (63 and 100-112)
- 39 Adaptor plate (63 and 100-112)
- 40 Cable gland
- 43 Terminal box / Adaptor plate to frame gasket (63...112)
- 72 Corrugated disc spring for preloading ball-bearing
- 80 Internal circlip for retaining ball bearing at Non-Drive end shield (special arrangement on request)
- 81 V-Ring (Oil seal)
- 82 Canopy
- 83 Permanent capacitor
- 84 Starting capacitor
- 85 Electronic start relay - Capacitor start / capacitor run design

SHADED POLE MOTORS

The shaded pole FAN MOTORS are designed, manufactured and controlled according to VDE recommendations and marked with CE mark. The totally enclosed FAN MOTORS are protected against dust and humidity as per IP 42 protection class. The end - shields with thin ribs are pressure - die - cast aluminium alloy, help cooling of motor and bearings. The permanently self lubricating and aligning sintered sleeve bearings which are preferred for horizontal mounting only, provide noise and maintenance free long working years at any ambient temperature ranging from -30°C to +40°C. Ball bearing version is available on request for both vertical and horizontal mounting positions, in which case K suffix in type coding which stands for sleeve bearing will replace with R to identify ball bearing version (e.g. GF 8413R).

Fans of 200, 250 and 300 mm diameter are injection mould, fibreglass reinforced high grade polyamide.

USE : Specially designed for ventilators, condensing units and evaporators.

Single phase, 230 V - 50/60 Hz

Totally enclosed, IP 42
Insulation Class : "F" (155°C)
Temp. Rise : Class "B" (80K)

2 pole - 3000 min⁻¹ Air over motor & ventilated

| TYPE | Hz | RATED INPUT W | RATED OUTPUT W | FULL LOAD CURRENT (I _N) A | SPEED min ⁻¹ |
|---------|----|---------------|----------------|---------------------------------------|-------------------------|
| GF8213K | 50 | 49 | 5 | 0,36 | 2600 |
| | 60 | 42 | 5 | 0,31 | 3120 |
| GF8218K | 50 | 56 | 11 | 0,43 | 2620 |
| | 60 | 48 | 11 | 0,37 | 3140 |
| GF8225K | 50 | 76 | 19 | 0,56 | 2650 |
| | 60 | 65 | 19 | 0,49 | 3180 |
| GF8232K | 50 | 114 | 25 | 0,90 | 2600 |
| | 60 | 98 | 25 | 0,78 | 3120 |
| GF8238K | 50 | 120 | 30 | 0,95 | 2600 |
| | 60 | 104 | 30 | 0,82 | 3120 |

4 pole - 1500 min⁻¹ Air over motor & ventilated

| TYPE | Hz | RATED INPUT W | RATED OUTPUT W | FULL LOAD CURRENT (I _N) A | SPEED min ⁻¹ |
|---------|----|---------------|----------------|---------------------------------------|-------------------------|
| GF8413K | 50 | 36 | 5 | 0,22 | 1300 |
| | 60 | 31 | 5 | 0,19 | 1555 |
| GF8418K | 50 | 39 | 7,5 | 0,25 | 1310 |
| | 60 | 33 | 7,5 | 0,22 | 1565 |
| GF8425K | 50 | 58 | 13 | 0,40 | 1305 |
| | 60 | 49 | 13 | 0,35 | 1560 |
| GF8432K | 50 | 85 | 19 | 0,59 | 1310 |
| | 60 | 73 | 19 | 0,51 | 1565 |
| GF8438K | 50 | 92 | 24 | 0,64 | 1305 |
| | 60 | 81 | 24 | 0,56 | 1560 |

4 pole - 1500 min⁻¹ Impedance protection against locked rotor (max 150K)

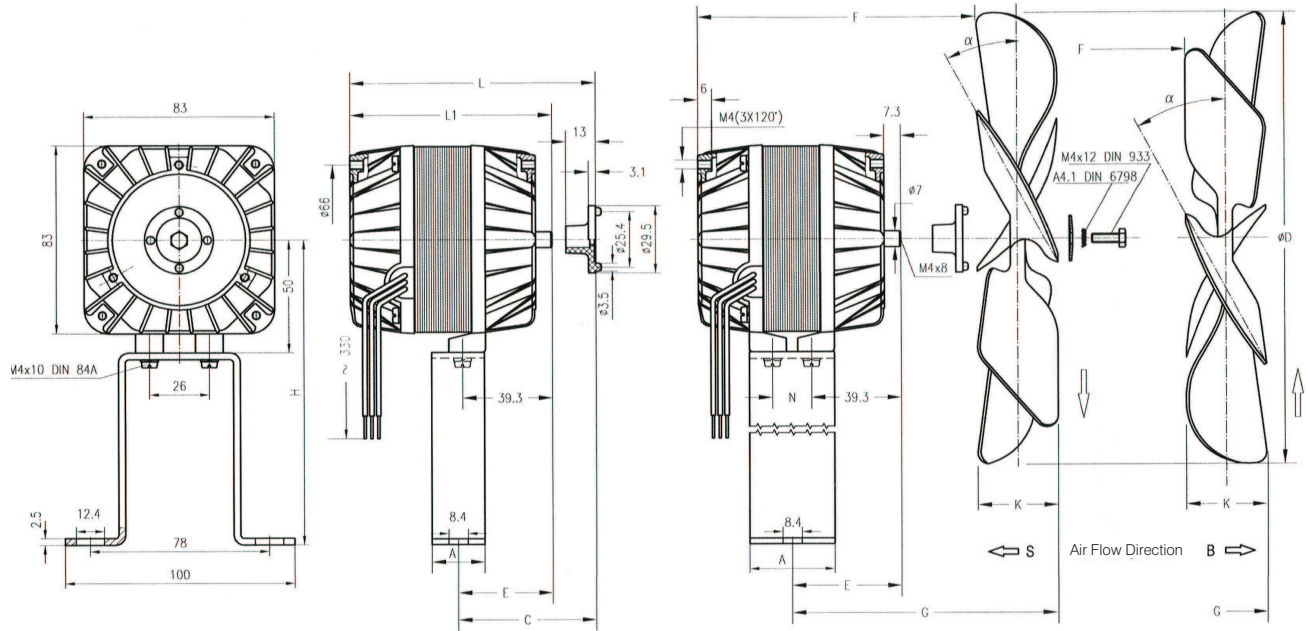
| | | | | | |
|----------|----|----|----|------|------|
| LGF8413K | 50 | 36 | 5 | 0,22 | 1305 |
| | 60 | 31 | 5 | 0,19 | 1560 |
| LGF8418K | 50 | 34 | 7 | 0,22 | 1310 |
| | 60 | 27 | 7 | 0,18 | 1565 |
| LGF8425K | 50 | 41 | 10 | 0,28 | 1300 |
| | 60 | 32 | 10 | 0,22 | 1555 |
| LGF8432K | 50 | 46 | 13 | 0,32 | 1330 |
| | 60 | 39 | 13 | 0,27 | 1590 |
| LGF8438K | 50 | 50 | 16 | 0,34 | 1300 |
| | 60 | 44 | 16 | 0,29 | 1555 |

4 pole - 1500 min⁻¹ Non ventilated

| | | | | | |
|----------|----|------|----|------|------|
| NGF8413K | 50 | 23,6 | 3 | 0,15 | 1320 |
| | 60 | 21 | 3 | 0,13 | 1580 |
| NGF8418K | 50 | 27,4 | 5 | 0,17 | 1310 |
| | 60 | 24 | 5 | 0,15 | 1565 |
| NGF8425K | 50 | 36,5 | 7 | 0,25 | 1320 |
| | 60 | 31 | 7 | 0,21 | 1580 |
| NGF8432K | 50 | 38 | 9 | 0,26 | 1300 |
| | 60 | 33 | 9 | 0,22 | 1555 |
| NGF8438K | 50 | 42 | 12 | 0,29 | 1300 |
| | 60 | 37 | 12 | 0,26 | 1555 |



DIMENSIONS



| TYPE | L | L ₁ | A | E | C | H | N | F | G | K | DØ | α |
|---------|-------|----------------|----|------|------|-----|----|------|-------|----|-----|------|
| GF8413K | 78,8 | 76,3 | 23 | 41,3 | 43,8 | 105 | - | 62,3 | 97,3 | 35 | 200 | 28 |
| | | | | | | 135 | | 64,1 | 96,1 | 32 | 250 | 22 |
| GF8418K | 83,8 | 81,3 | | | | | | 71,1 | 99,1 | 28 | 300 | 16 |
| GF8425K | 90,8 | 88,3 | 37 | 47,8 | 50,3 | 158 | 17 | 76,3 | 110,3 | 32 | 350 | 16,5 |
| GF8432K | 97,8 | 95,3 | 50 | 54,8 | 57,5 | | 24 | - | - | - | - | - |
| GF8438K | 103,8 | 101,3 | | | | | 30 | | | | | |

All dimensions in mm

The dimensions of 2 pole motors are identical with 4 pole motors, however please consult **GAMAK** for fan dimensions as it will be different than 4 pole fan dimensions.